



NASA Aviation Security Initiative

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April 30, 2002



NASA's Position Statement

“With the tragedy of September 11 we were forced to see how the freedom and open way of life we enjoy makes us vulnerable. The attack and events that followed reinforced how physical and economic security go hand in hand. Now more than ever in our recent history, it is important that we look at our country as whole, rallying our assets and talents toward common goals. NASA's capabilities can be marshaled to support the goal of providing for our security.”

From “Pioneering the Future”

An Address by Sean O’Keefe, NASA Administrator

To The Maxwell School of Citizenship & Public Affairs

April 12, 2002



**How can NASA's capabilities support
the goal of providing for U.S. security?**

**Why NASA?
What is the potential contribution
NASA can make?**



NASA's Mission Statement Relative to Security

NASA's security goal is inspired by the events of Sept. 11 to include:

- ...sharing NASA's unique technology and imagery with other government agencies, academia and industry
- to thwart those who seek to do harm or arrest trends that diminish our quality of life
- ...to design systems to preclude the use of commercial aircraft as weapons

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How Could Terrorists Seek to Do Us Harm?

Terrorist Objective:

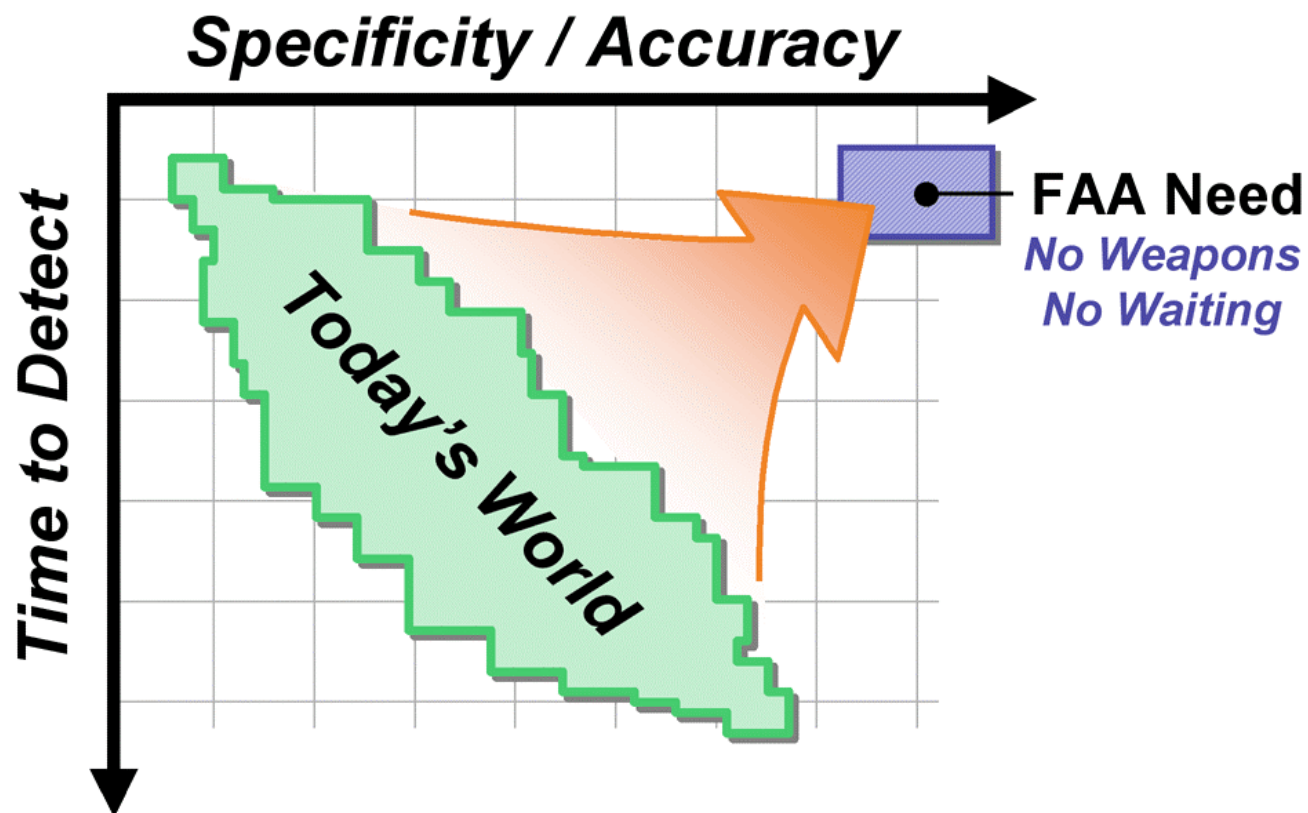
- Disrupt the American way of life
- Use commercial aircraft as they are a very visible target and attacks would serve to
 - impede air transportation industry,
 - destroy the aircraft and its passengers/cargo, or
 - create a weapon of mass destruction



Sensors

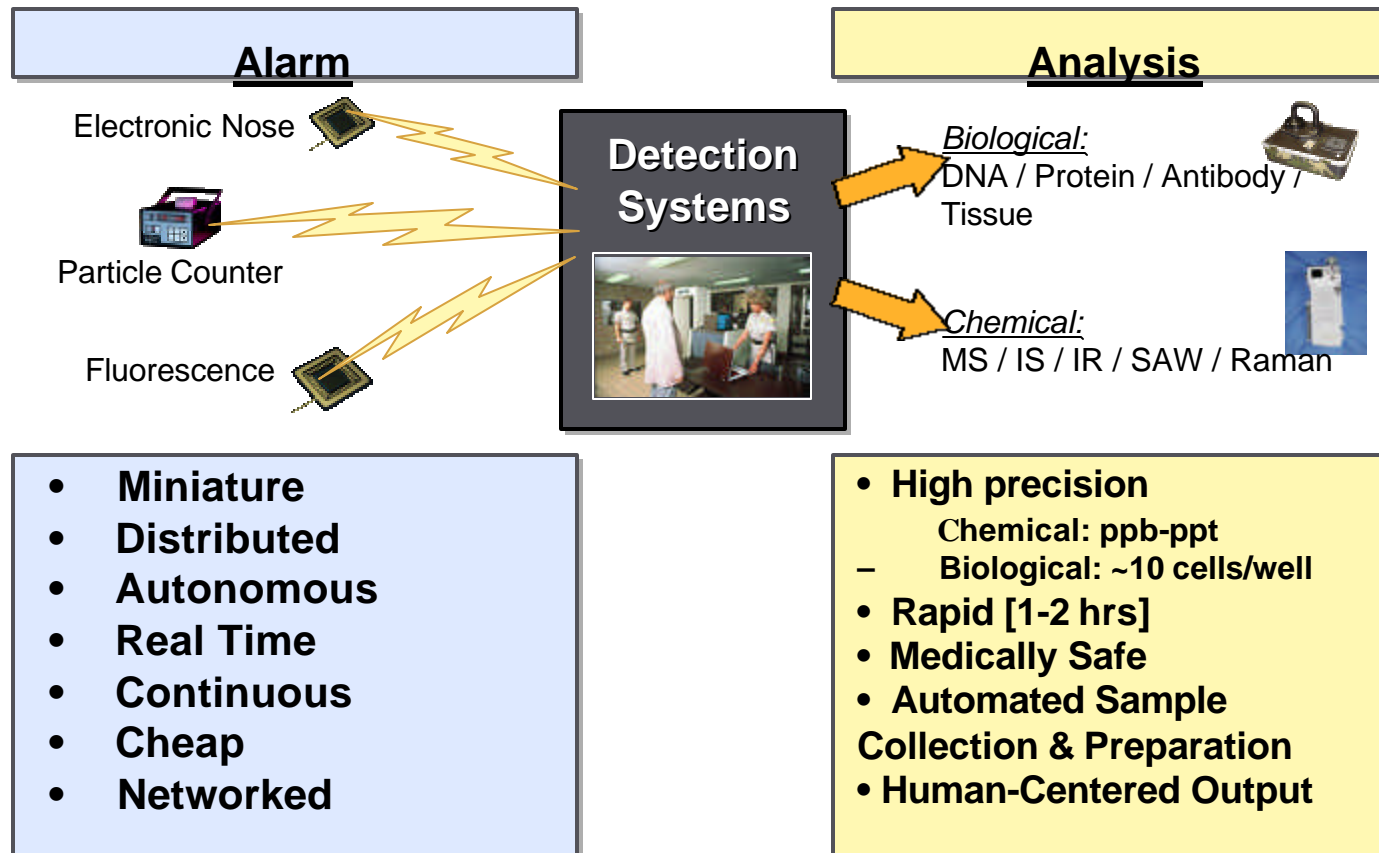


The Sensor Problem





Generic Sensor Architecture





Aircraft & System Hardening



Aircraft & Systems Hardening Framework

Structural Hardening



- Explosive Resistant, Lightweight Fuselage Materials
- Fire Resistant Materials
- Advanced Fuselage Design Concepts

Propulsion System Hardening



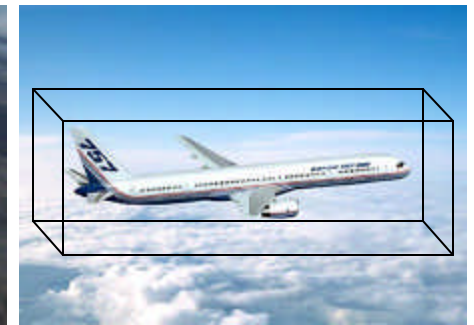
- Fuel Chemistry to Reduce Fire/Explosion Potential
- Fuel Tank Protection from Small Arms Fire
- Engine Design Concepts to Mitigate Ingestion Attacks

Digital System Hardening

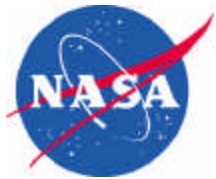


- Fail-Safe Systems and Fault-Tolerant Systems
- Secure and Continuous Data Transmissions
- Shielding Materials
- Onboard Flight Systems Monitoring

Vehicle System Hardening



- Intelligent Systems to Detect, Alert, and Counter Off-Nominal Conditions
- Monitor/Assess Pilot Intent
- Protected Area Avoidance System

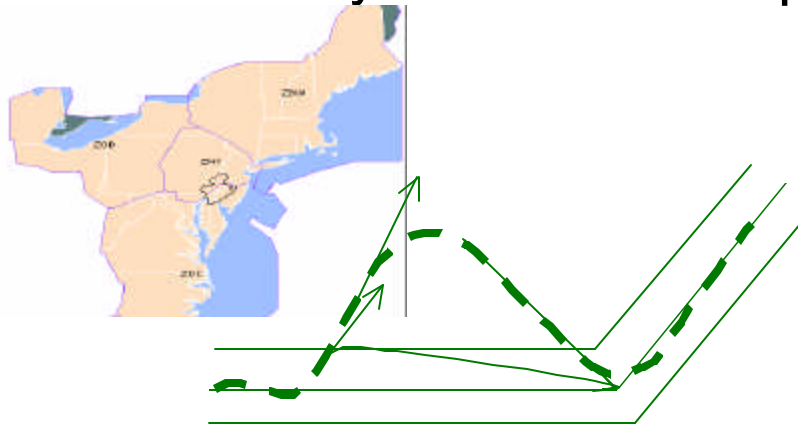


ATM Technologies

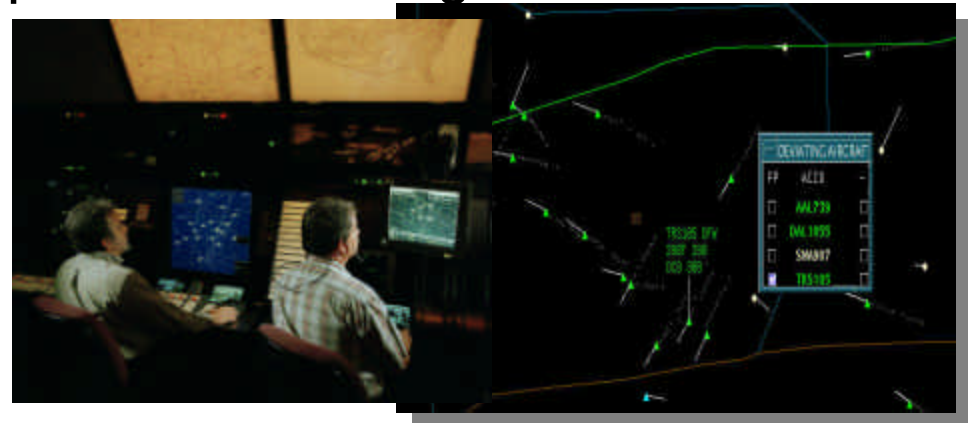


Potential Applications of ATM Technologies to Security

I. Security decision support technologies

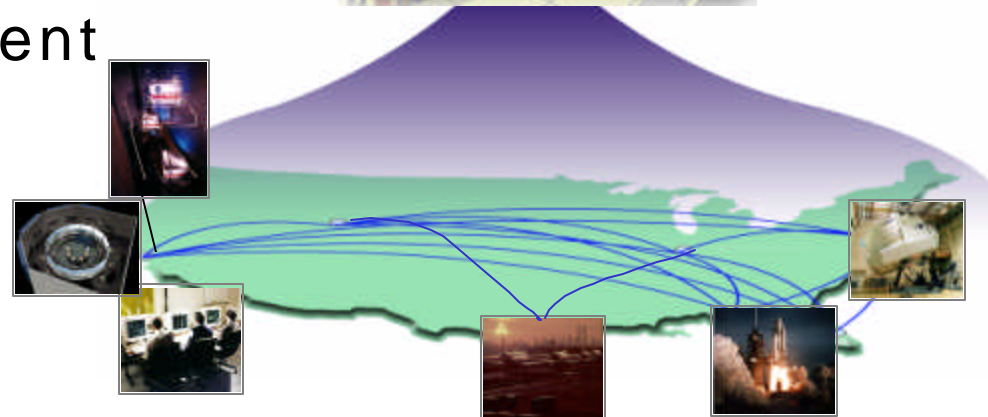


Automated Regional Assessment of Flight Paths



Centralized Monitor & Control

II. System-wide modeling and assessment

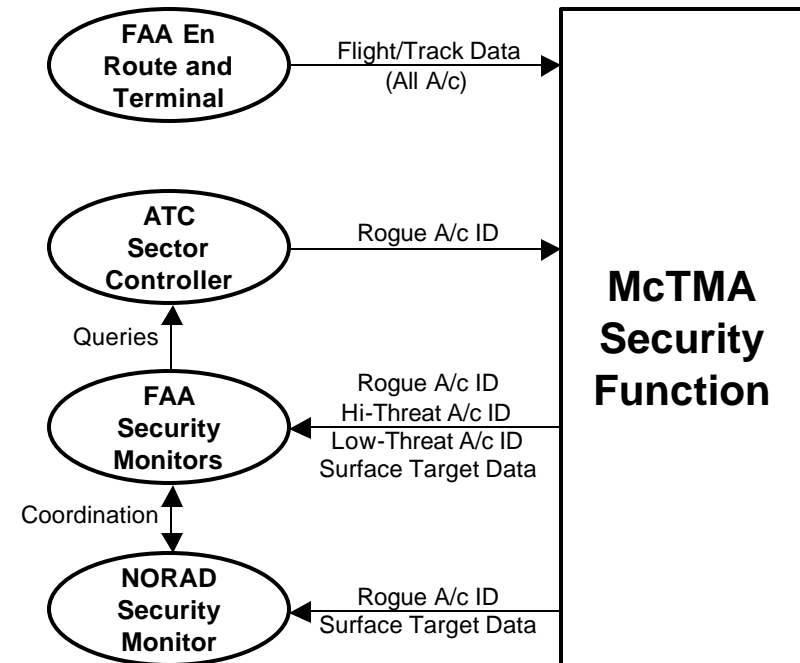




“Operations Architecture” Overview

- Controllers will determine if aircraft security status is “rogue” or not
- The system will provide processes and displays to support status-awareness of NAS security monitors
 - Aircraft will be classified as “rogue,” “high-threat,” “low-threat,” or “benign”
 - Controllers will detect and/or confirm “rogue” status
 - Non-benign aircraft will be displayed at the monitor positions
 - Surface-target data will have limited distribution due to INFOSEC constraints
 - NORAD queries will be directed initially to FAA Security Monitor positions
 - NORAD and FAA Security Monitors may query controllers in regard to specific aircraft

System Overview





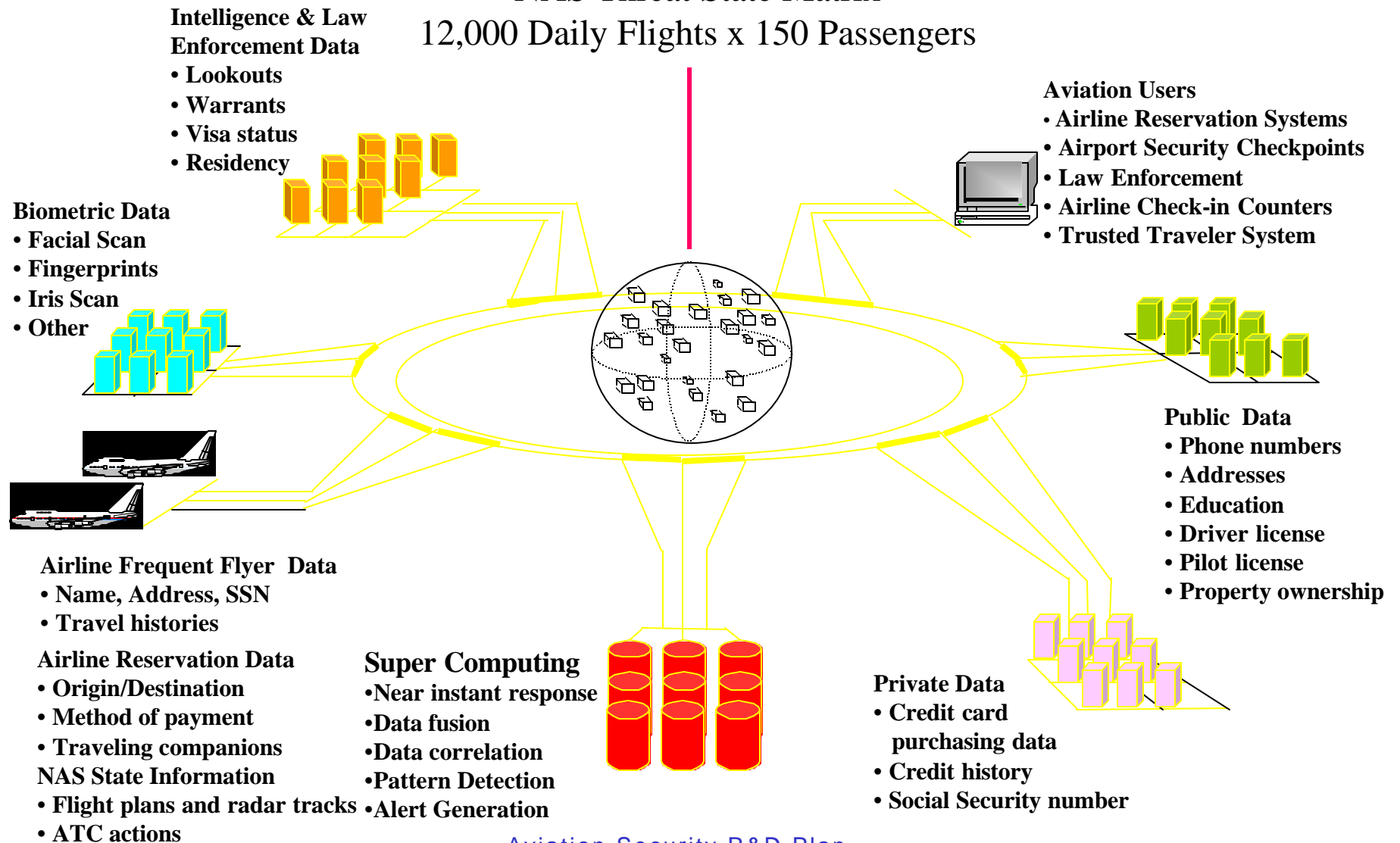
IT Technologies for Aviation Security Concepts



Vision for High Performance IT-Enabled Security System

NAS Threat State Matrix

12,000 Daily Flights x 150 Passengers





Related Activities

- As part of our long-term ATM research program, will seek funding to support the FAA in developing a secure, next generation CNS architecture



Thank You